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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

DETAILED ACTION

1. This communication is responsive to the Amendment filed 16 October 2006.
2. Claims 1-24 are pending in this application. Claims 1, 10, 13, 20, 22 and 24 are independent. In the Amendment filed 16 October 2006, claims 1, 3, 7, 8, 15, 20 and 22 were amended. This action is made Final.
3. The rejections of claims 1-6, 9-15 and 18-24 as being unpatentable over US Patent No 5,875,447 to Goel et al in view of US Patent No 6,757677 to Pham et al; and claims 7-8 and 16-17 as being unpatentable over US Patent No 5,875,447 to Goel et al in view of US Patent No 6,757677 to Pham et al in view of US Patent No 5,598,559 to Chaudhuri have been maintained.

Claim Objections

4. The objections to **claims 1, 3, 7, 8 and 15** have been withdrawn as necessitated by amendment.

Claim Rejections - 35 USC § 101

35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

5. **Claims 20-23** are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

Claims 20 and 22 claim a program product comprising a physical, computer readable signal bearing medium bearing the program code. The claim language provides evidence that the applicant intends the medium to include signals, as such, the claim is drawn to a form of energy. Energy is not one of the four categories of invention and therefore this claim is not statutory. Energy is not a series of steps or acts and thus is not a process. Energy is not a physical article or object and as such is not a machine or manufacture. Energy is not a combination of substances and therefore not a composition of matter. Therefore, the claim is directed towards nonstatutory subject matter.

To expedite a complete examination of the instant application, the claims rejected under 35 U.S.C. 101 (nonstatutory) above are further rejected as set forth below in anticipation of applicant amending these claims to place them within the four statutory categories of invention.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

8. **Claims 1-6, 9-15 and 18-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent No 5,875,447 to Goel et al (hereafter Goel et al) in view of US Patent No 6,757,677 to Pham et al (hereafter Pham et al).**

Referring to claim 1, Goel et al discloses a method for optimizing a database query, the database query including criteria that references a plurality of tables in order to re-order a result set generated for the database query (see abstract), the method comprising the steps of: applying transitive closure analysis to the query (see column 3, lines 26-30). However, Goel et al fail to explicitly teach the further limitation of based on the transitive closure analysis, rewriting the criteria to generate modified criteria to

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reduce the number of tables referenced thereby. Pham et al disclose an optimizer that is able to consider group-by operations as part of the optimization of a join (see abstract) including the further limitation of based on the transitive closure analysis, rewriting the criteria to generate modified criteria to reduce the number of tables referenced thereby (see column 2, lines 35-48 and column 9, lines 9-13 – the where clause is considered to represent the transient closure).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use Pham et al's optimizer with the method for the reordering of complex SQL queries involving group-bys and joins. One would have been motivated to do so in order to improve efficiency concerning the processing of complex SQL queries that contain Group-bys (Goel et al: see column 3, lines 17-19).

Referring to claim 2, the combination of Goel et al and Pham et al (hereafter Goel/Pham) discloses the method according to claim 1, wherein the criteria is one of a GROUP BY clause and an ORDER BY clause (Pham et al: see column 3, lines 9-13 – group by clause).

Referring to claim 3, Goel/Pham discloses the method according to claim 1, further comprising the step of: determining if the criteria references a first field from a first table and a second field from a second table (Pham et al: see column 3, lines 30-50 – x1 is considered to represent the first field from the first table; y3 is considered to represent the second field from a second table).

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Referring to claim 4, Goel/Pham discloses the method according to claim 3, wherein the rewriting step comprises the step of: rewriting the criteria to reference the first field and a third field from the first table (Pham et al: see column 5, lines 47-65).

Referring to claim 5, Goel/Pham discloses the method according to claim 1, further comprising the step of: determining if the criteria references a plurality of tables (Pham et al: see column 4, line 58 – column 5, line 13).

Referring to claim 6, Goel/Pham discloses the method according to claim 1, wherein the step of rewriting further includes the step of: rewriting the criteria to generate modified criteria that references only one table, based on the transitive closure analysis (Pham et al: see column 1, lines 50-65).

Referring to claim 9, Goel/Pham discloses the method according to claim 1, wherein the database query involves a plurality of join operations and the method further comprises the step of: running the query according to a join order that is based on the modified criteria (Pham et al: see column 6, lines 46-54).

Referring to claim 10, Goel et al discloses A method of optimizing a database query, the database query including criteria that operates to re-order a result set of the database query and requires creating a temporary file during operation (see abstract); the method comprising the steps of: applying transitive closure analysis to the query (see column 3, lines 26-30). However, Goel et al fail to explicitly teach the further limitations of based on the transitive closure analysis, rewriting the criteria to generate modified criteria to reduce the number of tables referenced thereby and said modified criteria operating to re-order a result set of the database query and avoid creating a

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temporary file during operation. Pham et al disclose an optimizer that is able to consider group-by operations as part of the optimization of a join (see abstract) including the further limitations of rewriting the criteria, based on the transitive closure analysis, to generate a modified criteria (see column 2, lines 35-48 and column 9, lines 9-13 – the where clause is considered to represent the transient closure); said modified criteria operating to re-order a result set of the database query and avoid creating a temporary file during operation (see column 6, lines 46-65).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use Pham et al's optimizer with the method for the reordering of complex SQL queries involving group-bys and joins. One would have been motivated to do so in order to improve efficiency concerning the processing of complex SQL queries that contain Group-bys (Goel et al: see column 3, lines 17-19).

Referring to claim 11, Goel/Pham discloses the method according to claim 10, wherein the criteria is one of a GROUP BY clause and an ORDER BY clause (Pham et al: see column 3, lines 9-13 – group by clause).

Referring to claim 12, Goel/Pham discloses the method according to claim 10, wherein the criteria references a plurality of tables (Pham et al: see column 4, line 58 – column 5, line 13) and the modified criteria references a single table (Pham et al: see column 1, lines 50-65).

Referring to claim 13, Goel et al discloses a method for optimizing a database query, the database query involving a plurality of join operations and a plurality of search conditions, (see abstract); the method comprising the steps of: applying

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transitive closure analysis to the plurality of search conditions to determine a subset of equivalent search fields (see column 3, lines 26-30). However, Goel et al fail to explicitly teach the further limitation of rewriting a criteria, that operates to re-order a result set of the database query, to generate a set of respective modified criteria that each reference one or more equivalent search fields. Pham et al disclose an optimizer that is able to consider group-by operations as part of the optimization of a join (see abstract) including the further limitation rewriting a criteria, that operates to re-order a result set of the database query, to generate a set of respective modified criteria that each reference one or more equivalent search fields (see column 2, lines 35-48 and column 9, lines 9-13 – the where clause is considered to represent the transient closure).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use Pham et al's optimizer with the method for the reordering of complex SQL queries involving group-bys and joins. One would have been motivated to do so in order to improve efficiency concerning the processing of complex SQL queries that contain Group-bys (Goel et al: see column 3, lines 17-19).

Referring to claim 14, Goel/Pham discloses the method according to claim 13, wherein the modified criteria comprises one of an ORDER BY clause and a GROUP BY clause (Pham et al: see column 3, lines 9-13 – Group-by clause).

Referring to claim 15, Goel/Pham discloses the method according to claim 13; further comprising the step of: running the query according to a join order, the join order

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determined by selecting one of the set of respective modified criteria (Pham et al: see column 14, lines 42-61).

Referring to claim 18, Goel/Pham discloses the method according to claim 13, further comprising the step of: running the query according to a join order, the join order determined by selecting one of the subset of respective modified criteria (Pham et al: see column 13, line 41 – column 14, line 18).

Referring to claim 19, Goel/Pham discloses method according to claim 13, further comprising the steps of:

performing cost analysis on each of the set of respective modified criteria (Goel et al: see column 15, lines 20-25); and

running the query according to a join order, the join order determined based on the cost analysis (Goel et al: see column 15, lines 20-25).

Referring to claim 20, Goel/Pham discloses a program product comprising a signal bearing medium bearing the program code (Goel et al: see column 8, lines 59-64). Therefore, the program product of claim 20 is rejected on the same grounds as the method of claim 1.

Referring to claim 21, Goel/Pham discloses the program product of claim 20, wherein the program code is further configured to: run the query according to a join order that is based on the modified criteria (Pham et al: see column 6, line 46-54 – modifying the group-by clause).

Referring to claim 22, Goel/Pham discloses a program product comprising a signal bearing medium bearing the program code (Goel et al: see column 8, lines 59-

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64). Therefore, the program product of claim 22 is rejected on the same grounds as the method of claim 13.

Referring to claim 23, Goel/Pham discloses the program product of claim 22, wherein the program code is further configured to: run the query according to a join order that is based on the modified criteria (Pham et al: see column 6, line 46-54 – modifying the group-by clause).

Referring to claim 24, Goel/Pham discloses an apparatus comprising a processor (Pham et al: see column 16, lines 57-60) coupled to a memory (Pham et al: see column 16, lines 53-57 – storage unit). Therefore, the apparatus of claim 24 is rejected on the same grounds as the method of claim 1.

9. Claims 7-8 and 16-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent No 5,875,447 to Goel et al (hereafter Goel et al) in view of US Patent No 6,757,677 to Pham et al as applied respectively to claims 6, 1 and 13 above, and further in view of US Patent No 5,598,559 to Chaudhuri.

Referring to claim 7, Goel/Pham discloses a method for optimizing a database query. However, Goel/Pham fails to explicitly disclose the further limitation of building an index over a column of the one table. Chaudhuri discloses a method for optimizing queries having group-by operations (see abstract), including the further limitation of building an index over a column of the one table (see column 7, line 55 – column 8, line 26).

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It would have been obvious to one of ordinary skill in the art at the time the invention was made to use Chaudhuri's step of indexing the tables as a subcomponent to the method for the reordering of complex SQL queries involving group-bys and joins. One would have been motivated to do so in order to improve efficiency concerning the processing of complex SQL queries that contain Group-bys (Goel et al: see column 3, lines 17-19).

Referring to claim 8, Goel/Pham discloses a method for optimizing a database query. However, Goel/Pham fails to explicitly disclose the further limitation of building an index over more than one column of a table among a plurality of tables. Chaudhuri discloses a method for optimizing queries having group-by operations (see abstract), including the further limitation of building an index over more than one column of a table among a plurality of tables (see column 7, line 55 – column 8, line 26).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use Chaudhuri's step of indexing the tables as a subcomponent to the method for the reordering of complex SQL queries involving group-bys and joins. One would have been motivated to do so in order to improve efficiency concerning the processing of complex SQL queries that contain Group-bys (Goel et al: see column 3, lines 17-19).

Referring to claim 16, Goel/Pham discloses a method for optimizing a database query. However, Goel/Pham fails to explicitly disclose the further limitation of identifying a subset of the respective modified criteria that reference a single, respective table and for which an index to that table exists. Chaudhuri discloses a method for optimizing

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queries having group-by operations (see abstract), including the further limitation of identifying a subset of the respective modified criteria that reference a single, respective table and for which an index to that table exists (see column 4, line 60 – column 5, line 25 and column 7, line 55 – column 8, line 26).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use Chaudhuri's step of identifying subsets as a subcomponent to the method for the reordering of complex SQL queries involving group-bys and joins. One would have been motivated to do so in order to improve efficiency concerning the processing of complex SQL queries that contain Group-bys (Goel et al: see column 3, lines 17-19).

Referring to claim 17, Goel/Pham discloses a method for optimizing a database query. However, Goel/Pham fails to explicitly disclose the further limitation of identifying a subset of the respective modified criteria that reference a single, respective table and for which an index is to be created. Chaudhuri discloses a method for optimizing queries having group-by operations (see abstract), including the further limitation of identifying a subset of the respective modified criteria that reference a single, respective table and for which an index is to be created (see column 4, line 60 – column 5, line 25 and column 7, line 55 – column 8, line 26).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use Chaudhuri's step of identifying subsets as a subcomponent to the method for the reordering of complex SQL queries involving group-bys and joins. One would have been motivated to do so in order to improve efficiency concerning the

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processing of complex SQL queries that contain Group-bys (Goel et al: see column 3, lines 17-19).

Response to Arguments

10. Applicant's arguments filed 16 October 2007 have been fully considered but they are not persuasive.

11. In regards to the 35 U.S.C. 101 rejections of claims 20 and 22, the amendment fails to overcome the rejection. It is unclear what is meant by a physical, computer readable signal since the specification fails to define a physical, computer readable signal and signals are not considered to represent something physical to one of ordinary skill in the art.

12. In regards to the arguments on pages 8-9 referring to the prior art rejection of claim 1 (also applies to independent claims 20 and 24), the applicants' argue: Pham does disclose the optimization of queries including GROUP BY clauses; however, there is no disclosure of applying transitive closure analysis to the GROUP BY clauses, nor of doing so for the purpose of reducing the number of tables referenced by such clauses.

In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., applying transitive closure to the group by clause) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993). It is noted that the claim recites "applying transitive

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closure to the query; and based on the transitive closure analysis, rewriting the criteria to generate modified criteria to reduce the number of tables referenced thereby.”

In regards to the argument “there is nothing in the reference that refers to reducing the number of tables referenced by a GROUP BY clause,” the examiner respectfully disagrees. See for example column 5, lines 22-63. The representation of Query 1 shown in lines 47-63 groups by x1, z1, y2, z2 and z3, which requires the use of 3 tables. The representation of Query 1 shown in lines 26-33 uses “WHERE z1=y2 and z2=z3” which then allows the GROUP BY clause to only require the use of table 1 to produce a result equivalent to the other representation of Query 1.

13. In regards to the arguments on pages 9-10 referring to the prior art rejection of claim 10, the applicants' argue: It is important to note, however, that claim 10 recites in part that transitive closure analysis is performed on a criteria that re-orders a result set for a query and requires creating a temporary file during operation. Claim 10 further recites that the transitive closure analysis is performed for the purpose of rewriting the criteria to re-order a result set and avoid creating a temporary file.

In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., transitive closure analysis is performed on a criteria that re-orders a result set for a query) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993). It is noted that the claim recites “applying transitive closure analysis to the query; and rewriting the

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criteria, based on the transitive closure analysis.” These limitations are considered to be different than performing transitive closure on the criteria.

In response to applicant's arguments, the recitation “requires creating a temporary file during operation” has not been given patentable weight because the recitation occurs in the preamble. A preamble is generally not accorded any patentable weight where it merely recites the purpose of a process or the intended use of a structure, and where the body of the claim does not depend on the preamble for completeness but, instead, the process steps or structural limitations are able to stand alone. See *In re Hirao*, 535 F.2d 67, 190 USPQ 15 (CCPA 1976) and *Kropa v. Robie*, 187 F.2d 150, 152, 88 USPQ 478, 481 (CCPA 1951).

In regards to the argument “While Goel and Pham both generally attempt to optimize queries with GROUP BY clauses, neither reference, alone or in combination, discloses or suggests rewriting a GROUP BY clause, or any other criteria that re-orders a result set, to avoid the creation of a temporary file,” the examiner respectfully disagrees. See for example column 5, lines 22-63. The representation of Query 1 shown in lines 47-63 groups by x1, z1, y2, z2 and z3, which requires the use of 3 tables. When the query is written in this manner, it can be seen that three different views have to be created and then those 3 views combined. The three views created before combining them are considered to represent temporary files. The representation of Query 1 shown in lines 26-33 uses “WHERE z1=y2 and z2=z3” which then allows the GROUP BY clause to only require the use of table 1 to produce a result equivalent to the other representation of Query 1. When the query is written in this manner, the

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GROUP BY clause only requires the use of Table 1 and therefore there is no need for a temporary file.

In regards to the arguments on pages 10-11 referring to the prior art rejection of claim 13 (also applies to independent claim 22), the applicants' argue: At nowhere in any of the cited passages of Pham, however, is there any discussion or suggestion of rewriting a criteria that operates to re-order a result set, much less doing so to generate a set of modified criteria that each reference one or more equivalent search fields, as required by claim 13. The cited passages discuss the use of partial group-by operators; however, Applicants can find no reference to modifying a criteria in a query that re-orders a result set. In addition, Applicants can find no reference to rewriting any portion of a query to reference equivalent search fields, much less to do so based upon transitive closure analysis that determines equivalent search fields.

The examiner respectfully disagrees. See for example column 5, lines 22-63. The representation of Query 1 shown in lines 47-63 groups by x1, z1, y2, z2 and z3, which requires the use of 3 tables. The representation of Query 1 shown in lines 26-33 uses "WHERE z1=y2 and z2=z3" which then allows the GROUP BY clause to only require the use of table 1 to produce a result equivalent to the other representation of Query 1. This modified Group BY clause produces an equivalent search field as the GROUP BY clause, which requires the use of x1, z1, y2, z2 and z3.

Conclusion

14. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

Contact Information


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kimberly Lovel whose telephone number is (571) 272-2750. The examiner can normally be reached on 8:00 - 4:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John Cottingham can be reached on (571) 272-7079. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Kimberly Lovel
Examiner
Art Unit 2167

25 April 2007
kml


JOHN COTTINGHAM
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2100

